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In the Claims:

1. (Currently amended) A method for determining optimum bond parameters for a bond force F_B and an ultrasonic variable P_B and, optionally, at least one further bond parameter G_B of a Wire Bonder for a bond process, whereby for this determination a number of bond cycles are carried out, whereby for each bond cycle a wire connection is made between a connection point of a semiconductor chip and a connection point of a substrate in that a wire end protruding out of a capillary is melted into a ball and then, in a bond position, the wire ball is attached to the connection point of the semiconductor chip, then the wire pulled through to the required length, formed into a wire loop and attached to the connection point of the substrate, and whereby the bond force F_B, the ultrasonic variable P_B and, if necessary, the at least one further bond parameter G_B are each varied in discrete steps within a predefined range, wherein with each bond cycle n, after attaching the wire ball to the connection point of the semiconductor chip, the following steps are carried out:

a) Application of a predetermined bond force F_{B1},

b) Movement of the capillary out of the bond position in a predetermined direction whereby the current $I_n(t)$ flowing through the drive which moves the capillary is monitored in the course of time t,

c) Stopping the movement of the capillary as soon as the current $I_n(t)$ ~~reduces~~ decreases,

d) Determining the maximum of the current $I_{n,max}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$) from the progression of the current $I_n(t)$ established during steps b) and c) whereby the variables $F_{B,n}$, $P_{B,n}$ and $G_{B,n}$ are the values for bond force F_B, the ultrasonic variable P_B and, if necessary, the at least one further bond parameter G_B set for bond cycle n,

and wherein from the values $I_{n,max}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$) established with the n bonding processes those values for the bond force F_B, the ultrasonic variable P_B and the, if necessary, at least one further bond parameter G_B are determined as optimum bond parameters for which the current $I_{n,max}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$) reaches a maximum.

2. (Currently amended) A method for determining the optimum bond parameters for a bond force F_W and an ultrasonic variable P_W and, optionally, at least one further bond parameter G_W of a Wire Bonder for a bonding process, whereby for this determination a number of bond cycles are carried out, whereby for each bond cycle a wire connection is made between a connection point of a semiconductor chip and a

connection point of a substrate, in that a wire end protruding out of a capillary is melted into a ball and then, in a bond position, the wire ball is attached to the connection point of the semiconductor chip, then the wire pulled through to the required length, formed into a wire loop and attached to the connection point of the substrate, and whereby the bond force F_W, the ultrasonic variable P_W and, if necessary, the at least one further bond parameter G_W are each varied in discrete steps within a predefined range, wherein with each bond cycle n after attaching the wire to the connection point of the substrate the following steps are carried out:

a) Application of a predetermined bond force F_{W1},

b) Movement of the capillary out of the bond position in a predetermined direction whereby the current $I_n(t)$ flowing through the drive which moves the capillary is monitored in the course of time t,

c) Stopping the movement of the capillary as soon as the current $I_n(t)$ ~~reduces~~ decreases,

e) Determining the maximum of the current $I_{n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) from the progression of the current $I_n(t)$ established during steps b) and c) whereby the variables $F_{W,n}$, $P_{W,n}$ and $G_{W,n}$ are the values for bond force F_W, the ultrasonic variable P_W and, if necessary, the at least one further bond parameter G_W set for bond cycle n,

and wherein from the values $I_{n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) established with the n bonding processes those values for the bond force F_W, the ultrasonic variable P_W and the, if necessary, at least one further bond parameter G_W are determined as optimum bond parameters for which the current $I_{n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) reaches a maximum.

3. (Currently amended) A method for in situ monitoring of the quality of bond connections which are produced by means of a wire-feeding capillary of a Wire Bonder with predetermined values F_1, P_1, G_1 of a bond force F, an ultrasonic variable P and at least one further bond parameter G, wherein a to be tested, selected bond connection is made as follows:

Making a bond connection with predefined values F_2, P_2, G_2 for the bond force F, the ultrasonic variable P and the at least one further bond parameter G, whereby at least one of the values F_2, P_2, G_2 is less than the corresponding value F_1, P_1, G_1.

Carrying out a test according to the following steps:

a) Application of a predetermined bond force F_3,

b) Movement of the capillary out of the bond position in a predetermined direction whereby the current $I_n(t)$ flowing through the drive which moves the capillary is monitored over the course of time t,

c) Stopping the movement of the capillary as soon as the current I(t) ~~reduces~~ decreases,

d) Determining the maximum current I_{max} (F_3, P_3, G_3) from the progression of the current I(t) established during steps b) and c);

and

Making the bond connection with the values F_1, P_1, G_1.

4. (Original) The method of claim 3, wherein the value P_2 is less than the value P_1.